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Field Production of Ettersburg 121 Strawberry

Report of Field Survey

By

C. E. SCHUSTER

CORVALLIS, OREGON

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SUMMARY

The survey covered 372.67 acres of Ettersburg 121 strawberry plantings; 192.25 were listed as to exact soil types.

No particular fertilizer can be recommended for Ettersburg 121 strawberries. Each soil will be a problem by itself.

Interplanting varieties in order to cross-pollinate had no beneficial effects in increasing crops.

Deep cultivation destroys the roots, which extend from 18 to 30 inches or more from the crown.

Need and effects of irrigation on this variety are little understood.

The source of plants had no bearing on production if the plants were true to name and healthy.

Heavy types of soil as found in the Willamette and Chehalis series are the best adapted to the variety.

The better drained types of these heavy soils are the most satisfactory. Good drainage alone is no indication of the suitability of any soil.

Elevation alone is not a factor in the fruiting of Ettersburg 121 strawberry.

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Field Production of Ettersburg 121 Strawberry

Report of Field Survey

By

C. E. Schuster

The Ettersburg 121 strawberry, a creation of Albert F. Etters, of Ettersburg, California, has been planted and tested from the standpoint both of the canneryman and the grower. From the canner's standpoint this is the most successful canning berry grown in this section. It is medium in size, firm in flesh, and holds its color well. It has been so satisfactory from the canner's standpoint that it has commanded a premium the last season or two. This premium for the fruit has made it attractive to the grower. In addition, the vigor of the plant allows easier handling in the field in many ways, though the great development of runners is a drawback. The vigor, moreover, has given the plant a greater resistance to the strawberry root weevil than have the plants of many other strawberry varieties.

The variety has been tried by the growers and found very satisfactory in some localities, while in other places it was found to be extremely unsatisfactory. This drawback to the variety lies in the fact that too often the crop has been very light. The light crop might be due either to the small number of berries set, which occurs in many cases, or to the large number of small berries produced after the first or second picking, as is found in many plantings. It matters not whether the number of berries was too small to produce a good crop or the sizable berries made up such a small proportion of the crop as to make it unprofitable. In either case the returns to the grower were too low to warrant handling the variety, even at increased prices.

Due to the demand for the berry by cannerymen and to the many failures of the variety in the field, the Oregon Experiment Station undertook a study of this variety under field conditions.

SCOPE OF THE WORK

Before undertaking experimental work of any type it was thought advisable to make a survey of conditions in the field. There was little uniformity in practice and it was thought that a study of these practices might bring to light some valuable information either negative or positive. In this survey data were secured on several points upon which there had been a question among the berry growers, including the number of acres, the age of the planting, the yield as far back as records were available, fertilizers used, the different methods of cultivation, whether irrigation had been practiced or not, the altitude at which the berries were grown, the type of soil, and the pollination practices.

The number of acres covered in the survey and included in this report was 372.67 acres on 129 plantings. The records of many others were so incomplete in many cases and impossible to use to any satisfaction that they were omitted. In some cases the omission was due to the fact that the patches had been planted in 1925 or fall of 1924.

A second survey was made of soil types alone. This was on but 45 places with an acreage of 192.25 acres. On these acreages the records were very complete from the standpoint of yield and other practices. With many of the other plantings the survey was just as complete except as to the soil survey itself. In the soil survey, as outlined later, the places tested were those of representative types in the location or district. It was thought unnecessary to make a detailed place-to-place survey in regard to soil types.

In three cases only was a patch found bearing its fifth crop. In many instances a patch was found in its second and third year, but most of the acreage was bearing its first real crop. The acreage being planted in 1925 was apparently almost equal to the acreage already in bearing, and if the indications were true, the new plantings for the season of 1925-26 will be very large again. The total acreage coming into bearing in 1927 will probably be very large, for there will be but a relatively limited amount of acreage to be plowed up due to old age, though some will be discarded due to light bearing. It would seem from a study of prospective acreage of all types of strawberries that there will soon be a surplus of berries.

FERTILIZERS

From the study of the fertilization practices nothing was noted to indicate that any special fertilization practices had bearing enough on the productivity or non-productivity of the Ettersburg 121 to warrant the assumption that such a fertilization could be applied generally with beneficial results, especially to those plantings showing a record of low yields.

Commercial fertilizers were used to a very limited extent by the growers. The type of soil varied widely as can be readily seen under the soil survey which is reported later in this circular. Very few growers had even tried fertilizers, but when tried, the fertilizer was nearly always either nitrate of soda or a complete fertilizer. The result from the grower's standpoint was negligible with that type of fertilization.

In one district where the Willamette clay and silt loam soils predominated, the use of a special fertilizer (consisting of 1 part of nitrate of soda, 125 pounds; 2 parts of superphosphate, 250 pounds) was found beneficial. Such a fertilizer was found suitable for this type of soil as it has been handled there in the past. It could hardly be expected to prove beneficial on all soils as each soil is a problem in itself. There is great variation in availability of plant food between the different types of soil and there would be considerable variation on the same types of soils, depending upon the cultural practices employed in the past.

The general practice where commercial fertilizers were not being used, and even where they were being applied, was to use rotation crops and apply barnyard manure to such an extent that fertility was maintained at a high level. In many cases this was satisfactory. In other instances it was found that additional fertilizers were beneficial in increasing the crop and in that way increasing the returns per acre.

POLLINATION

In no case have any benefits been obtained from interplanting, and where new patches were being set out by the same person, no inter-

planting was being practiced. Practically all commercial varieties grown in this section have been interplanted at one time or another with the Ettersburg 121. Due to the failure of the greater part of the terminal blossoms of the Ettersburg 121 to set fruits, interplanting had been tried by about 25 of the growers interviewed.

The results obtained by the growers are in line with the results of the experimental work carried on in the past at the Experiment Station. It was found in those experiments that foreign pollen was of no more effect in setting fruits on the terminal blossoms than was the pollen of the Ettersburg 121 itself. The flowers at the division point of the fruit stalk and a small percentage of what were apparently terminal flowers would set fruit regardless of the variety of pollen placed on the blossoms, while the other terminal blossoms were entirely barren, supposedly because of defective structure of the pistil.

DRAINAGE

Good drainage alone was no indication of the possibilities of a heavy yield. Drainage was good in those patches having the highest production, but varied according to the type of land on which the fruit was grown. The better drained soils in a series like the Willamette series proved to be the best soils for the production of the Ettersburg 121. On the other hand, the types like the well drained light sandy loams or the hill soils were least satisfactory as to yields of any of the types investigated.

ALTITUDE

The failure of the Ettersburg 121 in the hills was apparently due not primarily to elevation but to the soil itself. The greatest influence was from the type of soil, which varies according to elevation in this section. For instance, the Willamette series of soils are universally found within a very close range of elevation. On the other hand the Olympic soils vary considerably in their elevation, but within that variation of elevation of the Olympic soils could be found no difference in the behavior of the Ettersburg 121 so long as the soil type was identical.

CULTIVATION

Probably in no other operation were greater variations found than in the practices of cultivation. The number of cultivations given a planting of strawberries varied from 4 or 5 to as high as 18 times in a season. Some were cultivating very shallow, some very deep, with all gradations in between.

The prevalence of the practice of deep cultivation, at least at some time of the year, brought up the danger of damage to the roots. The common belief held by those doing the cultivation was that the root system extended only a few inches beyond the crown of the plant. Root systems of plants of Ettersburg 121 that had borne their fourth crop at the Experiment Station grounds were washed out of the soil (see Fig. 1). In washing them out a spray machine was used with a pressure of 250 pounds. This pressure destroyed many of the fine fibrous growths but left the main roots attached in the ground. The main roots could be traced from 18 to 30 inches from the crown of the plant (Fig. 2) depending upon the distance apart the plants had been planted.

From this study it was found that where roots had once been cut away they did not readily renew themselves, but feeding rootlets were sent up into that part of the soil previously occupied by the roots which had been cut away. The new feeding rootlets came from roots lower down in the soil and not from the crown. This put an extra load on the remaining roots of the plants.

Fig. 1. Main root system of an Ettersburg 121 plant. When straightened out the longest root was 34 inches long.

When the cultivator is set down the full depth of the shovels to tear up the ground in the spring, the shovels cut away the roots, and the ability of the root system to furnish plant food and especially moisture in the latter part of the ripening season is greatly reduced. This method of cultivation, which is really a form of root pruning, has been proved to be of little or no value with any other form of fruit so it could scarcely be expected to be of value to the strawberry.

The essential reason for cultivation is to hold the moisture in the soil as long as possible. To do this a shallow mulch is just as effective as the deep mulch. Neither is it necessary to stir up the soil deeply in order to put it in good shape for the season. The plant will withstand the seasonal demands as readily and will not suffer from root cutting if shallow cultivation is used. One of the best tools for this is a shallow cutting shovel or sweep that runs only two inches or slightly deeper under the surface of the soil. There are modifications of these tools, but the principle is essentially the same. Shallow cutting to destroy the weed growth and to establish a mulch, with the former probably of the greater value, should be the aim of cultivation.

Excessive cultivation, especially with large shovels, is plainly of no value. The large shovel, by turning up moist earth, continually exposes the moisture direct to the drying of the winds. In many cases,

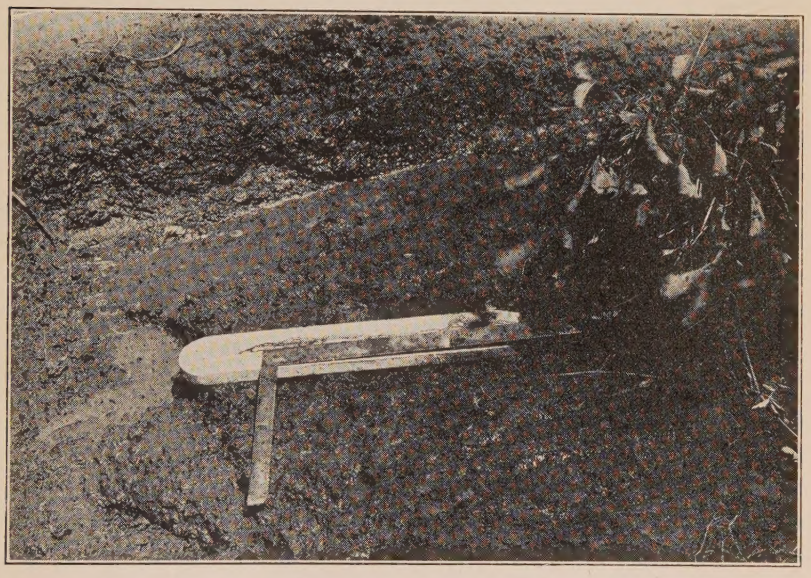

Fig. 2. Showing the distance the roots were traced from the crown.

continued cultivation means that, unless carefully regulated, the shovel runs a little deeper each successive time. If any form of work be conducive to small berries at the end of the season it would be the practice of deep cultivation, cutting the roots during or after the blooming season.

With few exceptions cultivation was carried on during the blooming and picking season. No detrimental facts could be noted and would not be expected except from deep cultivation.

The practice of packing or clod mashing in some form was very generally practiced, although this method is not theoretically conducive of the best moisture retention in the soil.

Runners were well kept off by most growers. No data of exact nature could be obtained on this, although the number of times the run-

ners were cut varied from 1 or 2 times a season with the bearing patch to 6 and 8 times with a younger age of patch. The number of times runners were cut during the seasons of bearing was evidently much less than with the new patch. Also, every one cut the tops after picking the berries, some burning the tops, but more merely working the material into the soil. With only a small amount of leaf spot on the Ettersburg 121 this would seem to be the best method. If allowed to dry out well after cutting, the leaf stalks and runners will break up quite freely and can be easily incorporated into the soil.

IRRIGATION

The application of irrigation to the Ettersburg 121 strawberry needs further study as to its possibilities. Irrigation was a much discussed problem in connection with the small berries at the end of the season. Many people thought the problem would be solved with a plentiful supply of moisture, such as would be furnished by irrigation. In two instances irrigation was found to have been tried, one case being Wapato silt loam, and the other Willamette loam soil. On these soils, and under their local conditions, no beneficial results were obtained in increasing the size of the berries as compared to those where irrigation was not applied.

In one other case the soil was Newberg sandy loam. The grower irrigated twelve times during the season, and obtained three tons of berries. The cases listed above are not comparable, and no explanation of the conflicting results is offered.

SOURCE OF PLANTS

Some men obtained young plants from two separate sources, a heavy bearing patch and a light bearing patch. No difference could be noticed in the berries when these plants were placed side by side in the field. Most of the plants used in developing new plantings naturally came from those men having had success with the berry, whose success encouraged their neighbors or others to plant the Ettersburg 121. It may be possible that there are mixtures of other berries included with the Ettersburg 121 in some cases, but other varieties of the characteristic growth and behavior of this berry are very rare, and very few have been brought into the state.

SOIL TYPES

The soils upon which the different berry acreages are located were identified and correlated with the classifications followed in the soil surveys of the Willamette Valley by the Soils department of the Experiment Station in cooperation with the United States Bureau of Soils. According to this method the soils are classed in three groups: (1) the residual soils of the upland, known locally as red hill soils; (2) the old valley filling soils occupying the valley floor well above the flood plains of the present streams; and (3) recent alluvial soils that now over-flow periodically. These groups are divided into soil series which include soil types. The soils of the series are similar in essential characteristics such as origin, topography, color, lime content, drainage, structure, sub-

soil conditions, and crop adaptation. The soil types within the series differ only in texture; that is, their content of sand, silt, and clay particles in the soil. The type is the unit in soil classification; e. g., Willamette silt loam, Willamette loam, etc.

KEY TO CLASSIFICATION OF WILLAMETTE VALLEY SOILS

I. Residual Soils—Red to Brown Hill Soils.

(a) From Basaltic Rock

Olympic.....Brown surface on brown subsoils.
Aiken.....Red surface on red subsoils.
Cascade.....Brown surface soils on yellow subsoils.
Viola.....Gray-brown soils on yellow brown subsurface on mottled compact subsoils (poor drainage).

(b) From Sandstones and Shales.

Melbourne.....Brown surface soils on yellow subsoils.
Sites.....Red surface soils on red subsoils.
Carlton.....Graybrown surface soils on gray mottled subsoils (imperfect drainage).

II. Old Valley Filling Soils—Valley Floor Soils.

Willamette.....Brown surface soils on brown subsoils.
Hillsboro.....Brown surface soils on sandier brown subsoils.
Salem.....Brown surface soils on brown gravelly subsoils.
Dayton (Whiteland).....Gray surface soils on mottled stiff gray and yellow subsoils (poor drainage).
Amity (Half Whiteland).....Gray brown soils on mottled gray and yellow subsoils (poor drainage).
Concord.....Gray Dayton surface and Amity subsoils.
Holcomb.....Gray brown soils on gray compact subsoils.
Clackamas.....Dark brown soils on gravelly brown compact subsoils.
Canby.....Dark brown soils on loose gravelly brown subsoils.
Grande Ronde.....Light yellow brown soils on yellow mottled subsoils.

III. Recent Alluvial Soils—Over-flow Soils (First Bench).

Newberg.....Brown soils on sandier brown subsoils.
Chehalis.....Brown soils on heavier brown subsoils.
Gales.....Brown soils on gravelly light brown subsoils.
Wapato....Brown soils on gray brown subsoils (poor drainage).
Cove (Black Sticky).....Black soils on heavy dark subsoils (poor drainage.)
Whiteson.....Gray soils on drab mottled subsoils (poor drainage.)
Molalla.....Dark brown soils on mottle subsoils (poor drainage.)

The classification and description of soils was furnished by C. V. Ruzek of the Soils department, Oregon Experiment Station.

CORRELATION OF PRODUCTIVITY TO SOIL TYPES

Soil type	Total acreage	Total yield	Average yield
		tons	*tons*
Willamette silt loam	34½	79	2.3
Willamette clay loam	11¼	20¼	1.8
Willamette loam	9¼	14	1.6
Chehalis silty to clay loam	30¼	49½	1.6
Amity clay loam	14	21½	1.5
Amity silt loam	7½	10¼	1.4
Dayton silty loam	13¾	16	1.2
Wapato silty and clay loam	11	13	1.1+
Newberg silt to silt clay	22	26	1. +
Newberg sandy loam	4¾	4½	1. +
Olympic clay to silty clay loam	32	32¼	1. +
Chehalis medium sand	2	½	.25
Total	192.25	286.75	1.5

DISCUSSION OF SOIL TYPES

The accompanying table shows the reaction of this variety to different soils as noted by the crops reported. Judging from one year's survey, and in a year very favorable to the Ettersburg 121, the heavier soils are the ones best adapted to growing this variety. By checking back as far as possible, however, it was found that the good crops of 1925 were obtained by growers who had been successful over a period of years on heavier types of soil or by growers with their first crop on soils where uniformly good crops had been produced in previous years by other growers.

From the evidence at hand the Willamette series is considered as best adapted, with the heavier types of the Chehalis series very nearly as good. The sandy or gravelly types of the alluvial soils and the few types of the residual soils that were studied, have proved much inferior. So far, success has been had on certain of the "Old Valley Filling Soils," and on some of the "Recent Alluvial Soils." Plantings on other types of soil would, at this time, be considered as dubious, without any assurance of success.

These results are published in the hope of being a guide to future planters. In those sections or counties where soil maps have been published, reference to this map will indicate the kind of soil under consideration for planting. A study of the table above will then show what results have been obtained by other growers on the same types of soil. Many soils included in the classification of soils in the Willamette Valley are not listed in the table. On such soils either no planting of Ettersburg 121 could be found or the data consisted only in reports of past records and were not included but are on file at the Station.

In case the soils have not been mapped or classified, if samples are sent in according to instructions below such soils can be identified. That will be an aid in determining the possible value of such lands for growing Ettersburg 121.

DIRECTIONS FOR SOIL SAMPLING

1. Take samples from an open field and avoid paths, gopher holes, etc., from which modified and not typical samples are likely to be obtained.

2. Select an average spot, pull up growing plants on it, brush aside half decayed vegetable matter and bore or dig a vertical hole to a depth of eight inches. Get samples to this depth from several places in the field, mix these samples well on a piece of cloth or stout paper (avoid jute bagging), dry this mixed sample, put a quart in a clean canvas bag or box and label carefully. This sample represents the *surface soil.*

3. In the same manner get an average of the *subsoil,* taken below the surface sample, to the depth of approximately three feet. Place in separate bag and label.

4. Dig or bore to the depth of six feet, and if hard-pan or other peculiarity in structure is noted, send sample properly labeled. If solid rock is found, state at what average depth.

5. Send "Description of Land" giving as complete a history of the field as possible, name of nearest town, probable selling price of land, elevation above nearest river, directions and grade of slopes, drainage, how long cropped, by what crops or fruits, what yields, whether fertilizers have been applied, and any peculiarities which may have a bearing on the agricultural qualities of the soil.

6. State the Township, Range, and Section number of the land from which these samples are taken.

7. Do not fail to label samples carefully, placing name of sender on each sample wrapper.

8. Send samples prepaid to

SOILS DEPARTMENT,
O. A. C. EXPERIMENT STATION,
CORVALLIS, OREGON.